PORTFOLIO OF DIGITAL SOLUTIONS

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What is digital water?

A NOVEL CONCEPT

➔ Digital transformation of the whole water sector

BASED ON 5 PILLARS

1- Physical systems (sources of data: sensors)
2- Internet of Things (network of sensors)
3- Internet Services (online access and process of data)
4- Big and Small Data Analytics (algorithms to develop smart management tools)
5- Cyber Security (prevent online attacks)
Usefull for who?

FOR WATER MANAGERS ➔ To manage efficiently water resources
- real-time water monitoring (quality and quantity)
- water availability assessment
- water demand forecast
- early warning systems for leak detection
- Etc...

FOR THE WHOLE SOCIETY ➔ Because protecting water is a societal challenge for all, including cities and citizens
  ➔ Especially under current Climate Change

Session 1
Technical solutions
Local Water Forum
Session 2
NON Technical solutions
Examples of digital solutions for the water sector

**RAW WATER SUPPLY**

*Need expressed:* Upgrade the supervisory system for water quality and flow in the conveyence system.

**Solution developed:**

<table>
<thead>
<tr>
<th>Legacy system</th>
<th>Elements added/developed</th>
<th>Digital Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Water Company of Athens’s (EYDAP)</td>
<td>- 5 level meter stations installed in 1 aqueduct</td>
<td>2 dashboards to visualise real-time data either for water quality or for water flow -&gt; provide feedback to operation staff</td>
</tr>
<tr>
<td>- external raw water supply system serves the city of Athens (5,000,000 inhabitants) with 420 hm³/y</td>
<td>- 1 web platform (based on F4W free architecture)</td>
<td></td>
</tr>
<tr>
<td>- 250 km of aqueducts, and 4 major water reservoirs</td>
<td>- IT connectors to allow communication between NESSIE and F4W platform</td>
<td></td>
</tr>
<tr>
<td>- network of water quantity and quality sensors + NESSIE system (calculations)</td>
<td>- Algorithms and APIs</td>
<td></td>
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</table>
Examples of digital solutions for the water sector

DRINKING WATER SUPPLY AND DISTRIBUTION

Need expressed: Leakage detection on the distribution network

Solution developed:

<table>
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<tr>
<th>Legacy system</th>
<th>Elements added/developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>- SUEZ Eau France for SICASIL (South FR)</td>
<td>- 4 S::CAN multiparameter nanostations installed in the distribution network</td>
</tr>
<tr>
<td>- drinking water supply service in 8 municipalities, including Cannes</td>
<td>- Collection of historical and real-time data</td>
</tr>
<tr>
<td>- From 181,000 permanent inhab. to 500,000 during the peak season</td>
<td>- Algorithms and « black-box » model</td>
</tr>
<tr>
<td>- 987 km of supply network, production of 26 hm³/y on average</td>
<td></td>
</tr>
<tr>
<td>- network of sensors + AQUADVANCED® softwares (calculations)</td>
<td></td>
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</tbody>
</table>

Digital Solution

Inclusion of a new leak detection module into AQUADVANCED® Water Networks solution
Examples of digital solutions for the water sector

WASTEWATER TREATMENT

Need expressed: Improve operational efficiency - reduction of N₂O emissions

Solution developed:

Legacy system
- WATERNET’s Wastewater Treatment Plant West of Amsterdam
- capacity: 1 Million population equivalent
- of 7 treatment lanes -> 1 dedicated to investigate AI based process control strategy
- Legacy system: network of sensors + SCADA + calculations (PIMS) + dashboards

Elements added/developed
- Installation of 25 new sensors + calculation of soft sensors (= virtual calculated sensors)
- Dev of an automated Data Validation framework (to ensure data robustness)
- IT connectors to allow communication between legacy system and F4W platform
- NGSI-LD data models based on historical and real-time data

Digital Solution
40 parameters measured and transmit online
NH₄ prediction modelised in relation with waste water quality
Examples of digital solutions for the water sector

CITIZEN ENGAGEMENT IN A MORE WATER-EFFICIENT CONSUMPTION

Need expressed: Raise awareness and engage citizens in water efficiency practices

Solution developed:

- South West Water (SWW) the Water Utility for the South West of the UK
- 1 District Metered Area (DMA) serving a population of circa 5000 people
- 2,000 smart meters, flow and pressure meters at the entrance of the DMA, and a data transmission & management system.
- lump-sum bill for drinking water

Elements added/developed:

- 100+ smartmeters installed in households
- 1 web platform (based on F4W free architecture) to collect/analyse data
- 1 new API for SWW to follow water real consumption and detect leaks
- 1 mobile app for citizens

Digital Solutions

Figure 3: prototype utilities web application showing water consumption from customers

Figure 4: wireframe design of customer mobile app
Examples of digital solutions for the water sector

WATER RESOURCES MANAGEMENT

Need expressed: Raise general public awareness about rivers water quality

Solution developed:

- A free mobile application « En immersion »
- Developed by French Water Agencies and OFB (French Office of Biodiversity), in 2015
- [https://enimmersion-eau.fr/application-qualite-riviere/](https://enimmersion-eau.fr/application-qualite-riviere/)
- Allow anyone to know:
  * the ecological status of a FR river,
  * the species of fish living in,
  * know the quality of supervised bathing waters

This is an example of digital solution developed by the French river basin agencies.

*I hope that further examples will be provided during the discussion!!*
Thank you for your attention.